

Claims:

1. An electrochemical plating cell, comprising:
 - a cell body defining a first fluid volume;
 - an anode positioned in a lower portion of the cell body;
 - a first membrane positioned across the cell body above the anode, the membrane forming a second fluid volume proximate the anode surface that is isolated from the first fluid volume;
 - a first fluid inlet in fluid communication with the first fluid volume;
 - a second fluid inlet in fluid communication with the second fluid volume; and
 - a fluid outlet in fluid communication with the second fluid volume.
2. The electrochemical plating cell of claim 1, wherein the second fluid inlet is positioned to direct fluid around the anode and out the fluid outlet.
3. The electrochemical plating cell of claim 1, further comprising:
 - a support ring circumscribing the anode; and
 - a second membrane positioned across the cell body below the anode.
4. The electrochemical plating cell of claim 1, further comprising an electrical connection extending through the cell body and contacting the anode.
5. The electrochemical plating cell of claim 1, wherein the first fluid inlet is positioned below the anode and configured to direct a plating solution upward through the plating cell toward a substrate being plated.
6. The electrochemical plating cell of claim 1, further comprising a fluid permeable diffusion member positioned across the cell body at a position above the anode and below an upper overflow weir of the cell body.

7. The electrochemical plating cell of claim 1, further comprising a degasser in communication with the first fluid inlet.
8. The electrochemical plating cell of claim 1, wherein the first membrane comprises a hydrophilic porous fluid permeable material.
9. The electrochemical plating cell of claim 1, wherein the second fluid inlet is configured to supply a fluid at a higher pressure than the first fluid inlet.
10. The electrochemical plating cell of claim 1, wherein the second fluid inlet and the first fluid outlet are configured to direct a fluid over the anode and remove the fluid from the plating cell without the fluid contacting the substrate being plated.
11. An electrochemical plating cell, comprising:
 - a cell body configured to contain a plating solution and having an opening sized to receive a substrate therein for plating;
 - an anode positioned in a lower portion of the cell body;
 - a first membrane positioned across the cell body above the anode, the membrane being positioned to separate the plating solution in the cell body from a fluid volume adjacent the anode;
 - a plating solution fluid inlet in fluid communication with a plating solution volume above the membrane;
 - an anode fluid inlet in fluid communication with the fluid volume adjacent the anode; and
 - a anode fluid outlet in fluid communication with the fluid volume adjacent the anode.
12. The electrochemical plating cell of claim 11, wherein the anode comprises a soluble metal.

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13. The electrochemical plating cell of claim 11, wherein the first membrane comprises a hydrophilic porous fluid permeable material.
14. The electrochemical plating cell of claim 11, wherein the anode fluid inlet is configured to provide a higher fluid pressure than the plating solution fluid inlet.
12. The electrochemical plating cell of claim 11, wherein the opening comprises a fluid outlet for the plating solution.
13. The electrochemical plating cell of claim 11, further comprising a second membrane positioned across the cell below the anode.
14. The electrochemical plating cell of claim 11, wherein the plating solution inlet is configured to supply a plating solution to the plating cell without the plating solution contacting the anode.
15. The electrochemical plating cell of claim 11, wherein the fluid volume adjacent the anode is separated from the plating solution.
16. An electrochemical plating cell, comprising:
 - a cell body defining a plating solution fluid volume;
 - an anode positioned in a lower portion of the cell body;
 - a membrane positioned over the anode, the membrane separating an anode fluid volume from the plating solution fluid volume;
 - a fluid inlet in communication with the anode fluid volume;
 - a fluid outlet in communication with the anode fluid volume; and
 - a plating solution inlet in fluid communication with the plating solution volume.
17. The plating cell of claim 16, wherein the membrane comprises a porous fluid permeable membrane.

18. The plating cell of claim 16, further comprising a filter membrane positioned across the plating solution fluid volume.
19. The plating cell of claim 16, further comprising an enclosure positioned around a perimeter and bottom portions of the anode.
20. The plating cell of claim 19, wherein the enclosure comprises a plastic ring portion surrounding the perimeter of the anode and a bottom encapsulation membrane positioned below the anode.
21. The plating cell of claim 16, wherein the plating solution inlet is positioned to direct plating solution upward through the plating cell toward a substrate immersed in the plating solution volume.
22. The plating cell of claim 16, wherein the plating solution inlet and the fluid inlet in fluid communication with the anode fluid volume are individually controlled to generate a higher fluid pressure in the anode fluid volume than in the plating solution fluid volume.